

SOIL SURVEY OF MECKLENBURG COUNTY, NORTH CAROLINA

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DESCRIPTION OF THE AREA.

Mecklenburg County lies on the southern boundary in the western part of North Carolina. It is bounded on the north by Iredell County, on the east by Cabarrus County, on the south by Union County and South Carolina, and on the west by South Carolina and Gaston and Lincoln Counties, which are separated from Mecklenburg by the Catawba River.

The county is very irregular in shape. It is indented on the south by the South Carolina line, runs to a sharp point on the east, and is

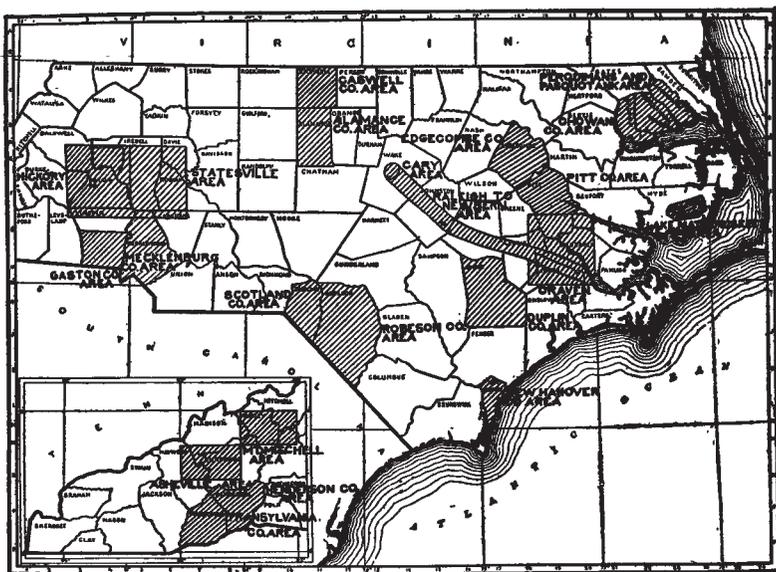


FIG. 10.—Sketch map showing location of the Mecklenburg County area, North Carolina.

confined by irregular lines on the northeast. In extreme dimensions it is 36 miles from north to south and 27 from east to west. It is quite narrow, however, at the northern end. It contains 543 square miles or 347,520 acres.

The topography is that of a plateau or tableland which has been much dissected and eroded by streams. The general surface features consist of a series of level to gently rolling interstream areas which

become more rolling, broken, and hilly as the larger streams are approached. The crests of these areas are level to gently rolling and lie beautifully for farming. The more level and undulating areas of the county are to the south of Shopton, where a basinlike area is situated, and to the southwest of Providence. The level to gently rolling interstream areas are numerous, but some of the more important areas lie between Matthews and Mint Hill, between Charlotte and Davidson, around Chadwick, Griffith, and Sharon Church, south of Bethel Church, near Caldwell, near Davidson, and west of Hopewell Church. Along the Catawba River, south of Clarks Creek, along the Cabarrus-Mecklenburg line, north of the town of Paw Creek, on Pine Ridge, north of Mallard Creek, along Salisbury Road near the county line, and near many of the other streams the country is rolling, hilly, and even broken to rough. In these localities erosion has been very pronounced and many gullies have been formed, especially along the Catawba River and some of the larger streams. The small streams have, in places, made deep inroads into the broad, gently rolling areas.

The elevation varies considerably in different parts of the county, as there is more than 300 feet difference between the country along the Catawba River on the South Carolina line and the high uplands near Davidson. The elevation on the Catawba River along the north boundary is 710 feet; at the southern boundary it is 520 feet. At Thompson Store the elevation is 765, at Charlotte 750, at Juneau 756, and at Pineville 570 feet above sea level. The general slope and drainage of the county is to the south and southwest, except along the eastern border, where it is to the east toward Rocky River.

There is a ridge which extends from the northern boundary to Derita, thence to Hickory Grove Church, and on by Mint Hill. All the water east of this ridge flows into Rocky River, and all to the west and south of it, which includes the greater part of the county, flows west and south, emptying directly or indirectly into the Catawba River.

The Catawba River flows southward along the western border of the county, while the Rocky River flows along the northeast corner. All the western, central, and southern portions are drained by Davidson, McDowells, Long, Paw, Steele, Little Sugar, Sugar, Brier, McMullen, McAlpine, and Fourmile Creeks. The eastern side is drained by Rocky River, West Branch Rocky River, and Clarks, Mallard, Back, Reedy, and Clear Creeks. All of these streams with their numerous tributaries furnish an excellent drainage system for the county. Some of them are swift flowing, and a small amount of water power has been used by grist mills and cotton gins. Large water powers have already been developed along the Catawba River for the running of cotton mills, and much more could be developed.

Mecklenburg County was formed in 1762 from Anson County, which comprised a large area. Mecklenburg at that time included the present territory of Cabarrus, Gaston, Lincoln, and a part of Union.

The county was largely settled by Scotch, with some Irish, Germans, and English. The immigrants to Mecklenburg County came from three directions. From Pennsylvania and Virginia came the Scotch-Irish, and then Germans; from Charleston and Georgetown, S. C., came the English, a few Scotch, and Huguenots; and lastly from eastern North Carolina came the English.

The people of Mecklenburg County were intelligent, labor-loving, industrious, and patriotic. They early felt their suppression by the English Crown and a band of them organized and declared war against the English Government. As a result of this the Mecklenburg Declaration of Independence was adopted and signed May 20, 1775, more than one year prior to that promulgated by the Congress at Philadelphia, July 4, 1776. The people of Mecklenburg celebrate this event annually on May 20, and this day is a State holiday.

While Mecklenburg County is the most populous county in the State, there is room for a much larger population. There are some large farms which could well be divided, and also areas of timber land, some abandoned old fields, and other neglected areas which could easily be converted into productive fields.

Charlotte, located a little south and west of the center of the county, is the county seat. It has a population of 34,014 and is not only the largest town in the county but the chief city in North Carolina. Davidson, Huntersville, Cornelius, Pineville, Matthews, and Chadwick-Hoskins are towns having populations ranging from 500 to 1,500. There are many smaller towns, flag stops, and sidings along the railroads. At Davidson is located Davidson College, while at Chadwick-Hoskins is the Southern Industrial School. About 140 manufacturing plants are in operation in Charlotte, in addition to a large number of cotton mills in other parts of the county. It is the center of the best electrical power development in the United States, and more than 300 cotton mills are located within a radius of 100 miles, a large number of which are run by electricity. Electricity is transmitted all over the county, supplying not only cotton mills but many other manufactories with power, and also lighting the small towns.

Mecklenburg County is favored with excellent railroad facilities, good roads, and other conveniences. The main line of the Southern Railway passes east and west across the county; the Columbia Branch extends south and the Taylorsville Branch north from Charlotte; and the Seaboard Air Line Railway enters at the southeast and runs northwesterly through the county. All of these roads cross or converge at Charlotte. The proposed interurban trolley line from Greenville, S. C., to Durham, N. C., will also pass through Charlotte.

Mecklenburg is and has been one of the foremost counties in agricultural and industrial lines and by far the foremost in the good roads movement in North Carolina. In 1884 the building of macadam roads was begun, and now there are 225 miles of well-graded and macadamized road in the county. Most of these radiate from Charlotte, and many cross links are being constructed. County convict labor is used on the road work, which is being rapidly pushed.

The rural free delivery of mail covers all parts of the county and not a rural post office is now found therein. The building of telephone lines has met with favor, and nearly every section of the county has been supplied.

The county is well supplied with schoolhouses, which are modern, neat, and well equipped, and many fine churches are located at various places. A large number of beautiful country houses are seen throughout the county. All these things indicate in a way the thrift and prosperity of many of the farmers.

Charlotte is an excellent market for all the products of the farm. Cotton finds a ready sale there and also at the various cotton mills throughout the county. Truck crops are in strong demand, as well as eggs, chickens, butter, and fruits. All of these products bring a high price and find a ready sale. The truck farmer has not kept pace with the demands of a growing city. Large quantities of these commodities are through necessity shipped into Charlotte from a distance. The employees of the cotton mills in the various towns create an active demand for country produce. Agriculture in Mecklenburg County has steadily advanced under this stimulant of ready markets and good prices.

CLIMATE.

The Weather Bureau has a station located in Charlotte, from the records of which the data given in the appended table have been compiled. An examination of these records will reveal the fact that the rainfall, ranging from 35 to 68 inches annually, is ample and is well distributed throughout the year. There need never be a crop failure on account of inadequate rainfall if conditions continue as favorable in the future as they have in the past. The range in temperature is from 102° F. on the hottest day to -5° F. for the coldest winter day, with an annual mean temperature of 60° F. The spring and fall months are almost ideal for farm work, while the summers are not excessively hot nor the winters extremely cold.

The average date of the last killing frost in the spring is April 1, and of the first in the fall is November 4. This gives a growing season of about 215 days—a sufficiently long time for the production of a wide range of crops.

Mecklenburg County, owing to its high elevation, topography, and good surface drainage, and also to the fact that good spring and

well water can be had in all parts of the county, possesses a healthful and invigorating climate. Around many of the farm houses excellent sanitary precautions are taken and as a result cleanliness and neatness prevail. Some, however, pay too little attention to these matters.

The following table gives the salient climatic data in detail:

Normal monthly, seasonal, and annual temperature and precipitation at Charlotte.

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
December.....	43	76	-5	3.8	1.9	5.7	2.2
January.....	41	77	-1	4.3	2.3	7.6	1.9
February.....	44	79	-5	4.6	5.4	6.4	2.9
Winter.....	43			12.7	9.6	19.7	7.0
March.....	51	85	14	4.8	1.6	9.2	.6
April.....	59	94	26	3.4	1.9	5.4	.1
May.....	69	97	38	3.9	1.7	4.8	.0
Spring.....	60			12.1	5.2	19.4	.7
June.....	76	102	45	4.6	3.4	9.5	.0
July.....	79	102	55	5.3	6.4	7.9	.0
August.....	77	100	53	5.2	1.0	2.1	.0
Summer.....	77			15.1	10.8	19.5	.0
September.....	72	99	38	3.3	4.7	3.6	.0
October.....	61	92	30	3.4	1.0	1.5	T.
November.....	51	80	18	3.0	3.7	4.7	T.
Fall.....	61			9.7	9.4	9.8	T.
Year.....	60	102	-5	49.6	35.0	68.4	7.7

AGRICULTURE.

The first land grants for the territory now embraced in Mecklenburg County date back to 1749. The settlers early began to produce small grain, corn, hogs, cattle, and sheep. Flax was grown to a limited extent and also some tobacco for home use. Indigo was grown at one time under stimulation of a Government bounty. By 1767 grist mills and tanyards were in operation. Trading was begun with Charleston, S. C., in hides, tallow, and cheese. A little later nearly every farmer had a distillery for converting the excess grain and fruits into whisky and brandy. It was easier to carry the distilled products to Charleston than it was to haul the heavy loads of grain.

Between 1782 and 1795 a considerable area of cotton was planted in the county. Cattle raising became of more importance, and most of the animals were sold in Charleston or Virginia. The decade between 1800 and 1810 was one of the most prosperous periods prior to the Civil War. The production of cotton increased until this became the important crop, although enough grain, corn, meat, and other products were grown for home use. The surplus of cotton, flax, sheep, cattle, and distilled liquors was sold in Charleston.

Mecklenburg was the leading county in North Carolina in the development of cotton growing. Large plantations were the rule rather than the exception, the larger ones ranging in size from 2,000 to 5,000 acres. The owners of these large tracts, which were operated by slaves, became wealthy. There were, however, many moderate-sized farms, whose owners made a good living. Land being plentiful and cheap, the planters did not give much attention to intensive farming or to the building up of the soil, but when a field began to show a decided decline in yields it was abandoned and a new field cleared to take its place. Wild peavines and grasses were abundant for grazing purposes, and the raising of cattle was at small expense.

Immediately after the Civil War Mecklenburg County was favored by home seekers and peaceful conditions soon prevailed. Money was scarce and the people through necessity began to increase the acreage devoted to cotton, the money crop, and from 1865 to 1880 the number of bales of cotton produced had increased from about 6,000 to 19,000. In the meantime there was a considerable decrease in wheat production and a large increase in the acreage devoted to oats, while that of corn remained fairly constant.

In 1900 more than 24,000 bales of cotton were produced, and about the same quantities of wheat, corn, and oats as in previous years. A large gain was noted in the quantity and variety of secondary crops, such as sweet potatoes, Irish potatoes, sorghum, cowpeas, garden vegetables, and orchard products. Considerable wheat was grown till about six years ago, but since that time the production has practically ceased, owing partly to the activity of the Hessian fly, which became destructive to the crop. This year, 1910, there has been a slight revival in the sowing of wheat.

At the present time cotton is the most important crop. A large quantity of corn is grown in the county, and this crop ranks second to cotton in value. A considerable quantity of oats is grown, but only a small acreage of wheat. Cowpeas are grown extensively, but the larger part of the crop is cut and cured for hay. Sweet potatoes, Irish potatoes, and cabbages are grown to a greater or less extent over the county. Sweet corn, tomatoes, green peas, turnips, radishes, strawberries, collards, and other vegetables are produced and con-

siderable quantities of these are sold in Charlotte. Watermelons and cantaloupes are grown commercially, though in a small way, and are ready-money crops. Patches of sorghum are grown and manufactured into sirup for home use. A little is sold to the local trade.

Of the fruits, apples predominate, and a few trees are found on nearly every farm. There are also peaches, pears, and a few cherries and grapes. The surplus of these products is sold in Charlotte. Fig trees are scattered over the county, largely on the Cecil soils. The Celestial and also the Brunswick and Brown Turkey are well suited to this section.

Few peanuts are grown. Their production could be extended upon the sandy soils.

Hogs and cattle are raised on every good farm, but only a very few sheep are seen in the county. Dairying is an important industry near Charlotte. Poultry raising is also attracting some attention and brings in a considerable revenue to the farmers.

Many of the best farmers are now operating their farms on a more scientific basis, but while the methods now used are in many cases very good, they are often not the best that could be employed. Within the last few years more attention has been given to the study of the adaptation of soils to the different crops than formerly, and improved yields are noted. It has been observed that the Meadow or bottom land and the Congaree fine sandy loam are especially suited to corn, while the latter soil also produces fine watermelons. Cantaloupes and watermelons are grown on the sandy loams of the Cecil series. Sweet potatoes, peanuts, and early truck crops make their best development on the light sandy loams; strawberries, cabbage, Irish potatoes, sweet corn, and tomatoes do best on either the better areas of sandy loams or Cecil clay loam. Sweet potatoes are not well suited to the heavy soils of the Iredell and Mecklenburg series. Johnson grass grows profusely on the Mecklenburg soils and Iredell loam.

Cowpeas grow well over the county, giving the best returns on the Cecil soils. The acreage is being increased annually. When intended to be cut for hay, as is usually the case, sorghum seed at the rate of one-half peck to the acre is sometimes sown with the peas. The Whippoorwill and Iron cowpeas seem to be favorite varieties, the latter being practically immune to wilt and rot.

The heavy lands are best suited to wheat, oats, the clovers, and vetches, although corn and cotton are grown with a fair degree of success on all the soils. Rye seems to fill out and fruit better on the sandy soils.

All lands intended to be planted to corn or cotton should have a winter cover crop of crimson clover, vetch, or rye. Clover, however, is a splendid crop to precede corn or cotton. In case there is no cover

crop, the land should be plowed deep in the fall or winter. It should be plowed again in the spring and finely pulverized. Shallow and frequent cultivation, being careful not to stir the soil when too wet, gives best returns. Cotton should not be laid by until it shades all the ground, so that weeds and grass will not grow. The cotton wilt is best treated by rotation. The King cotton does well on the Piedmont soils. Early maturing varieties should be selected for the heavy soils, as these soils tend to produce a rank growth of slow-maturing cotton, and many of the bolls fail to open before frost.

Corn should be planted in deep furrows, particularly on the rolling uplands. This gives the plants a better root development, and in dry seasons the drought is withstood better and level cultivation can be practiced more easily. For corn a deep, loose seed bed is essential. The furrow should be opened and fertilized thoroughly one or two weeks before planting the seed. Cultivators can be used, thus saving much hand work. Shallow cultivation should be practiced, especially near laying-by time, taking care not to break the feeding roots. Many make the mistake of plowing deep at this time, injuring the crop to a much greater extent than they suppose. It has been found that it pays to allow the fodder to cure on the stalk rather than to pull it while still green, as the increase in the yield of corn more than offsets the value of the fodder.

Large yields of wheat were formerly secured, and by proper preparation of the soil, with liberal applications of fertilizer, there seems to be no reason why wheat growing can not again assume some importance. When wheat follows corn or is sown on cowpea stubble it is not necessary to replot the land, but simply to disk it and make the surface very fine. It is best to sow after the first frost, so as to avoid the fall fly.

Practically all of the oats grown are winter oats, as spring-sown oats are not usually a success on account of rust. The oats should be sown early in the fall in order to get a good start before the ground freezes. To prevent rust the seed may be soaked in formalin, using 1 ounce to 3 gallons of water. The soil should be finely pulverized and acid phosphate and potash should be applied at the time of sowing. and nitrate of soda should be spread over the surface in the spring.

Crimson clover may be sown in cotton after first picking, at the last cultivation of corn, or in cowpeas. On soils acid in character an application of 20 to 30 bushels of lime per acre will be found to be beneficial. It is well also to apply from 200 to 400 pounds of acid phosphate per acre to give a vigorous growth. The field, if new to the crop, should be inoculated with soil where clover has been grown. From 15 to 18 pounds of seed should be used per acre. The time of sowing is from about September 15 to October 10. This crop greatly

improves the soil if plowed under, or makes good hay if cut before it is too ripe.

Some rotation is practiced by the best farmers, but no definite plan of crop arrangement is followed by the majority. Rotation is used only to a limited extent in the Black-jack section, where cotton is the principal crop. Some think it is best for cotton to run for several years on the same field, while others alternate corn and cotton, and a few even follow a three-year system. A good rotation in this case for the soil conditions in Mecklenburg County would be cotton, sowing crimson clover in the fall, with corn the following year with cowpeas put in at last plowing, and small grain the third year, sowing cowpeas again after harvesting. This allows cotton, a clean cultivated crop, to follow a nitrogen-gathering crop. The land improves under such management and the farmers are beginning to take advantage of this method of maintaining the productiveness of their soils.

In the raising of more cattle on the farms provision can easily be made for pasturage. The rolling and hilly areas could be seeded to grass, sowing 10 pounds of orchard grass, 5 pounds of redtop, and 10 pounds of Canada bluegrass. The soil should be prepared well and the seed brushed in at any time after September. This would make a good permanent pasture and afford excellent grazing. For hogs, rape may be grown, and also sorghum, chufas, and peanuts, feeding these crops till near fattening time, and fattening with corn for a few weeks. In this way meat can be produced at a low cost.

Commercial fertilizers are being used to a greater extent each year. Most of the complete fertilizer is of the low grade, commonly of the 8-2-2 or 8-3-3 formulas. The usual application is from 150 to 400 pounds per acre. Fertilizers are applied without any definite knowledge of the soil requirements. Many of the farmers now buy cottonseed meal, acid phosphate, and kainit or muriate of potash and mix them at home. This method has an advantage over the use of commercial mixtures, because most of the red clays require but little potash, while the Iredell soils need large amounts of kainit to counteract the rust in cotton and to keep the corn from frenching, and the planter can readily vary the proportion of his materials to suit his immediate needs. The use of nitrate of soda as a top dressing is becoming more general and excellent results are secured. A high-grade fertilizer low in potash is recommended for general use.

It is not a good practice to use cottonseed as a fertilizer, as it pays better to sell the seed or exchange it for meal. In this way the oil, which has no value as a fertilizer, is saved.

The growing scarcity of labor is beginning to have its bearing upon the farming operations in Mecklenburg County, and many are finding it necessary to confine their efforts to smaller areas. This

scarcity of labor, concurrent with its high price, has been a stimulus toward the use of improved labor-saving machinery, and more is being operated annually. Most of the labor both by the day and by the month is supplied by the colored race. In some parts of the county \$15 to \$20 a month, with house, garden spot, and firewood, is paid for farm help. Day laborers during the busy season usually receive \$1 a day. At the beginning of the season 50 cents per hundred pounds is given for picking cotton, but the price is increased to 75 cents per hundred toward the close of the season. In a few of the less developed and more remote sections of the county women and children as well as men work in the fields.

A large percentage of the farms in Mecklenburg County are operated directly by the owners, and most of the Black-jack section is farmed in this way. Of the land not tilled by the owners a part is leased in consideration of a cash rent, either a stated amount for a farm or per acre. Some land is rented for a part of the crop, usually one-third or one-fourth of the cotton and about the same proportion of the other crops. The share system is also in use. Under this method the landowner furnishes the land, work stock, feed for stock, implements, and one-half the fertilizer, and receives one-half of all the crops produced. The greatest defects of the renting and share system are the lack of rotation and disregard of general soil improvement, which result in the deterioration of the land.

Many of the farms and plantations prior to the war contained from 1,000 to 5,000 acres, particularly along the Catawba River, in the northern part. Most of these large bodies have been divided and some of the largest farms now are from 300 to 600 acres in size. There are many farms containing from 50 to 200 acres, and some smaller holdings of 20 to 40 acres. In the southwest corner of the county 125 acres represents about the average size. On the Iredell soils in the southern part the farms are larger than in other sections and holdings of 150 to 500 acres are common. The average size farm for the county is about 75 acres.

Land values in Mecklenburg County are greatly influenced by the growing city of Charlotte, its ready market for produce, and its system of macadamized roads. The good roads have facilitated the marketing of farm products and have advanced materially the value of rural property. Farm lands in the vicinity of Charlotte are held at \$150 to \$500 an acre; within 6 to 10 miles of the city the value ranges from \$50 to \$100; and the rougher areas and those more remote from railroads and markets bring from \$20 to \$40 an acre.

A few bodies of excellent oak and pine forest are seen, and the value of this merchantable timber, together with the cordwood, which sells at a high price at Charlotte, enhances considerably the value of such lands.

It is apparent from the large quantity of beef, pork, corn, flour, oats, hay, poultry, eggs, butter, and vegetables shipped into the county that the production of these home supplies and ready-money crops could be increased greatly and that their production would result in handsome profits to the farmers. There is excellent soil for trucking in the county, and the demand for truck crops could easily be supplied. More corn, wheat, oats, and hay could be produced on the same acreage by better preparation of the land and by applying more barnyard manure. Dairying could be extended in the county and butter made for the Charlotte market. The growing of more cowpeas and the curing of the vines for hay could well be extended.

Even in Mecklenburg County, which is comparatively thickly settled, one is impressed with the fact that the individual farmer in many instances is endeavoring to cultivate too many acres and therefore can not prepare the land with sufficient care to insure the highest yields. Over the county in some of the cleared fields are seen small eroded knolls or galled spots, brier patches, and plum thickets. By clearing up these places and covering the galled spots and gullies with coarse manure, sowing cowpeas and adding lime, all of these unsightly spots could easily be reclaimed and converted into fields of beauty and productiveness.

One of the essential steps toward improved yields is deeper plowing, subsoiling in November or December, and better preparation of the seed bed, particularly on the clays and clay loams and the heavier areas of the sandy loams. It is best to do most of the cultivation before the crops are planted and then give only shallow cultivation to the crops. All of the stiff land needs to be loosened and aerated in order to give the plant roots a larger feeding ground and to allow more rainfall to be absorbed for use in dry seasons. There is also a great need for humus in nearly all of the soils, and straw, leaves, barnyard manure, cowpea vines, and clovers when turned under will supply this, improving both the tilth and the moisture-holding capacity of the soil. Much terracing can be eliminated by deeper plowing and subsoiling. A great many are taking advantage of the cowpea as a soil improver, thus filling the soil with humus and nitrogen and increasing the yields. The more humus a soil contains the larger the quantity of fertilizer which can be profitably used, and when the nitrogen has been gathered from the air about one-half of the fertilizer bill is saved, as only acid phosphate and potash need be supplied.

A greater diversification and a more systematic rotation of crops should be practiced in order to build up the soils and increase the yields. Leguminous crops should alternate with clean-hoed crops, sowing winter cover crops to protect the fields in winter and to supply forage for stock and humus for the soil.

Too much attention can not be given to seed selection, to the germinating power of seed used, and to the matter of selecting a variety especially suited to each particular soil. A full stand of any crop is essential in order to secure the best yields.¹

SOILS.

Mecklenburg County lies in the Piedmont Plateau region, which extends from the Hudson River to east-central Alabama, attaining its greatest width and being well developed in North Carolina. The geological formations of this region are quite varied and complicated, but the more important ones are the granites, gneisses, schists, diorites, mica diorites, and gabbros or metagabbros. These rocks differ greatly in their chemical and physical composition, and their rate of disintegration and decomposition varies according to their hardness and their resistance to the forces of weathering.

The soils are chiefly of residual origin—that is, derived from the weathering of the underlying rocks in place.

In the southern part of the county, covering a large part of Steel Creek and Pineville Townships between Shopton and Kendrick Crossroads, around Pineville, and extending eastward beyond Downs Church in Providence Township; to the west and south of Hope-well Church, in the vicinity of Long Creek; northeast of Jonas Church, along the Cabarrus line on Salisbury Road; throughout Mallard Creek Township, and parts of Sharon Township; and in a few other places occur basic igneous rocks, such as mica diorite, gabbro diorite, and a few intermingled bodies of acid granite.

The mica diorite and gabbro diorite are heavy, massive rocks, dark gray to shiny black in color and composed of plagioclase feldspar, hornblende, mica, apatite, and magnetite—in some of the rocks as much as 13 per cent of the last named. The high percentage of magnetite in many of these rocks greatly influences the compass needle and makes surveying somewhat difficult. In some sections mica scales are abundant and crystals of apatite are very noticeable under the microscope. In a few places large stones were seen on the surface.

The weathering of these rocks has given rise to the Mecklenburg series, which is represented by a clay loam and a loam.

The diorite and the diorites with granites intermixed have weathered into the soils of the Iredell series, represented locally by the Iredell loam and Iredell fine sandy loam.

In all of the aforementioned rocks the weathering has not proceeded to any great depth, and the soft disintegrated rock showing

¹The North Carolina Department of Agriculture is determining the varieties of different crops adapted to the various soils, as well as the fertilizer requirements of the soils. Bulletins covering these questions can be secured by addressing Dr. B. W. Kilgore, State chemist, Raleigh N. C.

its original structure is usually found at 30 inches to 4 feet from the surface. There are a few exceptions to this, however, in some of the Mecklenburg soils.

The Mecklenburg and Iredell series are closely allied. The chief differences are these: The rocks giving the Mecklenburg soils contain more iron, are more micaceous, have a higher content of apatite, and have weathered to greater depth and more thoroughly than those giving rise to the Iredell soils. Hence the Mecklenburg soils are usually red in color and are considered more productive.

Across the north-central part of the county, extending in a north-east direction from the Catawba River west of Spurrier to the Cabarrus line on Clarks Creek, coarse-grained granite is encountered. A few spots of similar formation also occur south of Newell and south-east of Matthews. These rocks are composed of orthoclase, feldspar, quartz, and some mica, and in weathering form the Durham sandy loam. East of Ramah Church, around Sardis, and in two areas south of Fourmile Creek, and in a few other places are found medium to coarse-grained granites which give rise to the Cecil coarse sandy loam.

In the extreme eastern point of the county, bordering the Union County line for about 4 miles and touching Cabarrus County on the north, an area of slate is found which extends across several counties to the east and north. The weathering of these rocks gives rise to the Alamance silt loam.

All other sections and by far the greater part of the county is underlain by granites, gneisses, and to a less extent by schists. The uniform bodies of granite are particularly noticeable in the southwest corner of the county, east of Davidson, southwest of Cornelius, south of Huntersville, throughout the central part of the county around Charlotte and Juneau, near Providence, and in the vicinity of Harrison Church. Massive granite boulders occur on the surface in a few places, especially east of Davidson and in places along the Cabarrus line. These granites, gneisses, schists, and spots of gabbro have weathered down to a depth of several feet in most cases, but occasionally outcropping ledges are seen. The main differences in the various soil types, which are derived from these rocks, are due largely to the alteration of the surface by erosion, and to the carrying away of the fine material by rain waters. The streams which have eroded the country have in many places modified and changed the texture of the soils. The rocks are typical of the Piedmont Plateau and give rise to the Cecil series, which in this county embraces the Cecil coarse sandy loam, Cecil sandy loam, Cecil fine sandy loam, Cecil clay loam, and Cecil clay. These soils are similar to the soils first mapped in Cecil County, Md., and hence the types are called by that name.

The Mecklenburg series was first mapped in the present survey. The Iredell soils were first encountered in Iredell County.

The level areas along the rivers, creeks, and branches mapped as Congaree fine sandy loam and Meadow are of alluvial origin, that is, have been formed and are at present being modified by materials washed down and deposited by the streams.

The soils of Mecklenburg County, owing to the great variety of rocks and the extent of surface erosion, are complicated. In many cases they grade imperceptibly into one another and some of the types are so closely related that they could be separated only by boundaries more or less arbitrarily placed.

The following table gives the name and extent of each of the soil types mapped in Mecklenburg County:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Cecil clay loam.....	131,136	37.7	Durham sandy loam.....	7,616	2.2
Cecil sandy loam.....	67,648	19.5	Cecil coarse sandy loam.....	6,976	2.0
Cecil clay.....	39,168	11.3	Mecklenburg loam.....	5,824	1.7
Cecil fine sandy loam.....	22,272	6.4	Congaree fine sandy loam.....	3,200	.9
Iredell fine sandy loam.....	17,472	5.0	Alamance silt loam.....	1,280	.4
Meadow.....	16,320	4.7			
Iredell loam.....	14,592	4.2	Total.....	347,520	.....
Mecklenburg clay loam.....	14,016	4.0			

CECIL COARSE SANDY LOAM.

The surface soil of the Cecil coarse sandy loam consists of 5 to 10 inches of a yellowish-gray to gray coarse sandy loam, usually of a loose and porous structure. In a few localities a light-brown gravelly loam occurs, while in other spots a brown coarse sandy loam is found. Near Sardis and in a few other places the interstitial material is a fine sandy loam with considerable coarse sand and fine gravel. East of Davidson there are spots of Iredell soils throughout the type, and southeast of Davidson, along the Cabarrus line, small areas of Durham coarse sandy loam are not infrequently included. Such areas have a yellowish sandy clay subsoil. A small amount of gravel and quartz fragments are sometimes present.

The typical areas of Cecil coarse sandy loam are underlain to a depth of 36 inches or more by a stiff red clay containing a noticeable quantity of coarse, angular sand particles, the quantities being sufficient in a few places to give a friable clay. The subsoil varies greatly and in many places is a yellow, mottled, or even brown sticky clay. Some mica scales frequently occur in both soil and subsoil.

There are several bodies of Cecil coarse sandy loam scattered over the county, but the most important of these occur northeast of

Ramah Church on the Cabarrus line, north of Robinsons Store, northeast of Providence, and around Sardis.

The surface features of this soil vary from level and gently rolling to rolling and broken. The more uneven areas are found on the slopes approaching streams. In a few places the country is rough and erosion has been active. The open texture of the soil and the rolling surface promote excellent drainage in all the areas.

In origin this soil has been formed by the decay of coarse-grained granites composed mainly of feldspar, quartz, and a little mica. The feldspar gives the finer material and the quartz the coarser sand and fine gravel. Occasionally the surface is broken by large boulders of granite of irregular shape.

Most of the Cecil coarse sandy loam has been cleared and is now under cultivation. On the forested areas are seen mainly oak and pine, together with some hickory, sourwood, dogwood, and poplar. This soil is suited to early truck crops, peanuts, rye, berries, and tree fruits, and also to cotton and corn, and especially well to sweet potatoes.

Cotton produces one-third to 1 bale per acre, and corn 10 to 30 bushels. Cowpeas do well and rye gives good returns. Of oats only small yields are secured. Sweet potatoes and early truck crops give good results and can be grown to advantage near the markets.

This soil like its associated types needs more humus. The hillside fields should be planted in a winter cover crop; the more broken areas should be reforested or used as pasture. For further suggestions of methods to be used in handling this soil see description of Cecil sandy loam, which follows. The same fertilizers are applied to this type as used on the other sandy loams of the series.

The Cecil coarse sandy loam is held at \$15 to \$50 an acre.

The following table gives the results of mechanical analyses of the soil and subsoil of the Cecil coarse sandy loam:

Mechanical analyses of Cecil coarse sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23978.....	Soil.....	19.4	14.5	7.4	13.5	10.4	24.8	10.0
23979.....	Subsoil.....	5.0	6.6	3.3	7.4	3.0	28.7	45.7

CECIL SANDY LOAM.

The surface soil of the Cecil sandy loam, or "gray land," as it is locally called, consists of a light-gray or yellowish-gray to light-brown medium sandy loam, ranging in depth from 6 to 15 inches.

Both the color and texture vary greatly. Grayish, brownish, or reddish spots of sandy loam to clay frequently appear in the same field. Some areas consist of a reddish-brown heavy sandy loam, especially along contacts with the Cecil clay loam. In a few places the surface soil has a whitish appearance. In local spots the texture of the soil is light, open, and loose, approximating a sand. Part of the type around Juneau, south of Newell, and in a few other places shows a deeper soil, ranging from 15 to 20 inches. A few quartz fragments are present in the soil in some sections, and occasionally large granitic boulders are found on the surface.

Not infrequently small spots of clay loam, too small to be represented on the map, were included with this type.

The subsoil of typical areas is a stiff red clay, extending to a depth of 3 feet or more. In some places the content of angular quartz sand is sufficient to give a subsoil of some friability. South of Huntersville, near Juneau, and south of Newell the subsoil in some places has a reddish-yellow color or is beautifully mottled with red and yellow. In a few depressions and occasionally at the base of slopes a subsoil of nearly uniform yellow is found. Such areas are inclined to be porous and spongy and the bedrock is generally near the surface. There are also a few spots of brown sticky clay, due to the presence of small dikes of diorite. Mica scales occur in both soil and subsoil in typical areas.

The Cecil sandy loam is second in extent of the soils of the county. It is well distributed over the county and many large though irregularly shaped bodies were mapped. The more important and uniform areas are located in the southwest corner of the county on the Catawba River, along the South Carolina line, to the southwest of Cornelius, about $1\frac{1}{2}$ miles south of Huntersville, east of Newell, and in the neighborhood of Hickory Grove Church. Other large bodies occur in Charlotte Township, around Juneau, Sharon Church, and around Providence. A large area lies in the southern extremity of the county in the vicinity of Kell School and Harrison Church. Many other bodies and spots occur indiscriminately.

The type consists of level and gently rolling to rolling areas, becoming more rolling and broken as the streams are approached. Many of the broad interstream areas occur along the railroads and public roads, and such areas have a very favorable topography for general farming. In the southwest corner, along Catawba River, and in other places where the type has been dissected by streams, the surface is usually rolling, broken, and somewhat rough. In such places steep slopes are not uncommon. The open texture of the soil, coupled with its rolling topography, insures for it excellent surface drainage. Eroded and gullied areas are seen in places. It is this washing that has given rise to the wide variation in the texture of the

surface soil. On many of the slopes and hillsides terracing is practiced to control erosion.

The Cecil sandy loam is a residual soil and owes its origin to the weathering of granites, gneisses, and schists. Some of the large uniform areas in the southwest corner of the county, to the east of Davidson, and elsewhere, have been derived from granite. Usually these rocks have disintegrated to a considerable depth, but on some of the slopes soil erosion has kept close pace with decomposition, and the accumulation of the subsoil has not been deep, the rock even outcropping in places on eroded hillsides. The several rock formations are composed largely of feldspar and quartz, with some mica and hornblende. In some places on the slopes and knolls the finer material has been carried away in suspension by rainwater, leaving a looser and deeper layer of sandy material.

A large percentage of this type has been cleared and is now under cultivation, though a few bodies of merchantable timber exist. The original forest growth consisted of white, red, and post oak, hickory, considerable heart pine and loblolly pine, together with a little poplar, sourwood, dogwood, sweet gum, and cedar. The second growth is mainly old-field pine, interspersed with sweet gum, oak, and cedar.

The Cecil sandy loam in all its phases and variations is a mellow and easily tilled soil, one which warms up early in the spring, and one which invites the use of labor-saving machinery. It may be rightly termed the main trucking soil of the Piedmont Plateau in North Carolina. The more sandy areas are peculiarly suited to the production of early truck crops, and also sweet potatoes, Irish potatoes, peanuts, berries, melons, fruits, and bright tobacco, while the shallower and heavier areas are well adapted to the growing of cotton, corn, oats, cowpeas, and crimson clover.

Practically all crops common to the county are grown to a greater or less extent. Cotton, however, is the principal crop. The yields range from one-third to 1 bale per acre, averaging about two-thirds bale with good cultivation and liberal fertilization. The big-boll varieties do well on this type. Corn yields from 12 to 20 bushels per acre ordinarily, but by deeper plowing, more thorough cultivation, and liberal fertilization, or manuring, 40 to 60 bushels per acre can be easily produced. Considerable areas of oats are sown, but only a little wheat. Rye does well. Cowpeas are extensively grown, mainly for hay, of which from three-fourths ton to 1½ tons are secured per acre. Some peas are produced for seed. Sweet potatoes yield from 100 to 300 bushels per acre. Frequent patches and occasional small fields are devoted to peanuts. Sorghum is grown to a limited extent for making sirup. The yield is not quite as large as on the heavier soils, but the quality is fine. Watermelons make a strong growth, some of the melons weighing as much as 80 pounds. Irish

potatoes, cabbage, beans, cantaloupes, and truck crops, such as tomatoes, lettuce, onions, strawberries, turnips, radishes, and other garden vegetables, give good returns. Peaches, pears, cherries, apples, and figs are commonly seen around the houses. A few patches of alfalfa have been sown, and when inoculated, well manured, and limed, and the soil finely pulverized to a depth of 8 to 12 inches, good returns may be expected. Crimson clover is grown to some extent and more should be sown.

The large yields of corn and cotton secured by the best farmers indicate what this soil is capable of producing when properly prepared, manured, and fertilized. The type can be easily improved and the improvement made is quite lasting on account of the retentiveness of the red clay subsoil. One of the essential needs of this soil is a larger quantity of humus, and this can be supplied by growing cowpeas, crimson clover, vetch or soy beans, and by applying stable manure. It would be well, especially on the areas where the clay comes near the surface, to plow the land deeper, to secure a finer seed bed, to subsoil occasionally, and to give the crops better cultivation generally. A systematic rotation of crops, so as to include cowpeas and other legumes, would also aid in building up this soil to a state of high productiveness.

The use of commercial fertilizers is more or less general. Mixtures analyzing 8-2-2 or 8-3-3 are mainly used. Some farmers practice home mixing of fertilizers, using cottonseed meal, acid phosphate, and potash. Applications of nitrate of soda are also made during the growing season for cotton and corn. About 75 pounds per acre sown along the rows early in July has been found profitable. Nitrate of soda is also applied with good results to wheat and oats in the spring.

Land of this type varies greatly in price in different sections of the county. In the southwest corner the best improved land brings about \$40 an acre, the roughest from \$15 to \$25, while near Charlotte good areas of the type may be had from \$60 up to \$100 an acre.

The following table gives the average results of mechanical analyses of the soil and subsoil of the Cecil sandy loam:

Mechanical analyses of Cecil sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23974, 23976.....	Soil.....	5.0	19.4	19.3	23.9	6.9	19.7	5.7
23975, 23977.....	Subsoil.....	3.3	9.2	6.5	8.6	2.3	25.6	44.5

CECIL FINE SANDY LOAM.

The Cecil fine sandy loam to a depth of 6 to 12 inches is a mellow, friable sandy loam varying in color from yellowish gray to light brown. South of McAlpine Creek the soil is yellowish gray in color, while in certain places in limited areas in the eastern part of the county it is a whitish silty to very fine sandy loam. Between Matthews and Mint Hill and around Hoods the soil is a light-brown mellow fine sandy loam to very fine sandy loam, containing a large percentage of silt and ranging in depth from 5 to 7 inches. In this vicinity there is a gradation from this type into the Cecil clay loam. Some areas have a noticeable amount of coarse sand particles, and near the Cabarrus line and in a few other places brown quartz gravel are seen and also a few small rock fragments. On Pine Ridge near the Cabarrus line there are present large quantities of quartz and quartzite rock, the content being sufficient for this spot to be mapped as stony loam. The bedrock also comes near the surface. Usually the Cecil fine sandy loam is a mellow and easily tilled soil, and only in the heavier and more silty areas is there any baking or clodding.

The subsoil is commonly a stiff red clay, hard and tough, and extending to a depth of 36 inches or more. There are spots of reddish-yellow clay and also local areas of brown sticky clay, especially where areas of the type are intermingled with areas of the Iredell soils.

The Cecil fine sandy loam is for the most part confined to the southeastern and northeastern parts of the county. It is well developed around Matthews, near Hoods, along the Union County line, to the southeast of Amity Church, in the vicinity of Thompson Store, on Pine Ridge, around Paw Creek and near Sharon Church, and in many small spots elsewhere.

The surface features vary from gently rolling to hilly and broken. Between Matthews and Mint Hill along the Union County line and in many other places the surface is gently rolling, while near the Cabarrus line and in places south of McAlpine Creek the surface consists of hilly, broken areas, ridges, and knolls. On many of the slopes terracing has been necessary in order to prevent serious washing of the cultivated fields. The natural surface drainage is good, ditching being necessary, except perhaps in a few depressions.

This soil has been formed from the decay of fine-grained granites, schists, gneisses, and quartzite, and in places modified by diorite occurring as dikes. Most of these rocks have weathered to considerable depths, but occasionally the bedrock comes near the surface.

The forest growth consists of oak and pine, with some hickory, sourwood, dogwood, and cedar. The Cecil fine sandy loam is well suited to cotton, corn, melons, strawberries, potatoes, cabbage, and

in the heavier areas to wheat, oats, and cowpeas. Cotton yields from one-third to 1 bale per acre, depending upon the amount of fertilizer applied and the treatment of the soil. Corn, as a rule, gives low yields, but good crops can be easily secured. Sweet potatoes, oats, cabbage, crimson clover, and cowpeas do well. Strawberries grown on this soil yield heavily and have good size, flavor, and shipping qualities. Lady Thompson, Bubach, and Crimson Cluster seem to be the favorite varieties. They ripen the last of April and first of May. Considerable quantities of vegetables, including Irish potatoes, are produced. Tree fruits and sorghum for sirup constitute other secondary products of the type.

On the heavier areas of this soil the small grains, grasses, clovers, and corn can be made to give much larger yields by handling the soil differently. For increasing the productivity of this soil the same treatment can be followed as outlined under the Cecil sandy loam. From 200 to 400 pounds of an 8-3-3 fertilizer is used by the majority of farmers. Some, however, mix cotton seed, acid phosphate, and kainit, applying this in quantities varying from 150 to 200 pounds an acre. Cowpeas and clover and also barnyard manure improve the soil and always give increased yields in the succeeding crops. This land sells for \$20 to \$60 an acre.

The following table gives the results of mechanical analyses of the soil and subsoil of the Cecil fine sandy loam:

Mechanical analyses of Cecil fine sandy loam.

Number.	Description	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23980.....	Soil.....	0.8	5.1	10.0	30.8	28.3	19.9	5.1
23981.....	Subsoil.....	.6	2.1	2.3	7.5	6.3	27.3	53.7

CECIL CLAY LOAM.

The soil of the Cecil clay loam, or "red land," consists of a brown, red, or reddish-brown loam or clay loam with a depth of 4 to 8 inches. In some areas a heavy sandy loam usually brown, but sometimes gray in color, and having a depth of 2 to 4 inches, is found, beneath which occurs the typical loam or clay loam soil. Gravel, quartz, and other rock fragments are present in small quantities in local areas, and a few shale particles are found in the areas located in the eastern part of the county. Bodies of dark-brown or snuff-colored loam, which are locally known as "dead land" or "push-land," are not uncommon, and spots of Cecil clay are of frequent occurrence, especially on the slopes and knolls where the loam has been washed off and the subsoil exposed. Spots of Cecil sandy loam too small to be separately shown also occur

here and there through the type. It was impracticable to separate all these small patches or variations in the soil and show them on the soil map, but anyone having such variations on his farm can readily recognize them from the descriptions elsewhere in the report and can apply the methods of handling recommended for the respective soils. To the south and southeast of Charlotte for a few miles the soil is a brown to reddish-brown loam to clay loam, containing a considerable amount of angular coarse quartz sand or fine gravel. Between Matthews and Mint Hill and also in a few other sections a brown, heavy very fine sandy to silty loam, with a depth of 2 to 4 inches, was encountered. Only the red clay spots and more silty patches are inclined to clod and bake. The Cecil clay loam, owing to the higher percentage of sand in the surface soil, is more friable, works up into a better tilth, and is more easily handled as a rule than the Cecil clay.

The subsoil is a bright-red clay extending to a depth of 36 inches or more. This clay is tough and hard when dry and sticky when wet, and where typical is similar in every respect to the subsoil of the Cecil clay. In some places the presence of small scales of mica gives the clay a slightly greasy feel, and a few scales are sometimes seen in the surface soil. Spots of reddish-yellow to mottled clay occur where drainage and aeration have not been good.

The Cecil clay loam is the most important and by far the most extensive soil type in Mecklenburg County. It is well represented in about all parts of the county, but is more predominant through the central, eastern, and northern parts, where large irregular-shaped and continuous areas are encountered.

The characteristic surface features of the type vary greatly, consisting mainly of practically level and gently rolling to rolling areas, though in some places becoming hilly and broken. There are many level and gently rolling interstream areas which lie beautifully for farming operations, but which become rough, hilly, and broken as the streams are approached. The many small streams having their source in this type have cut deeply into the clay subsoil, and thus affected the topography. The surface is sufficiently rolling to insure the best natural drainage, except in a few slight depressions, and even these can be easily drained by ditches or tile underdrains. Terracing is practiced in many instances on the slopes to prevent washing and gullyng.

The Cecil clay loam has been formed from the disintegration and decomposition of granites, gneisses, and schists. These rocks are composed largely of feldspar, quartz, mica, and hornblende. The feldspar forms the clay, the quartz is left as sand, the mica as small scales, and the iron compounds have oxidized, giving the red color to the soil and subsoil. The narrow quartz veins occasionally found in the subsoil and the quartz fragments on the surface being harder have

withstood the forces of weathering to which the rocks as a whole have succumbed. In the eastern extremity of the county this type has been modified by materials derived from shale and slate formations. Most of the rocks underlying the Cecil clay loam have weathered to considerable depths, but on a few of the slopes the soil has washed off and the bed rock lies within 3 or 4 feet of the surface.

Though a large percentage of this type is cleared and under cultivation there are patches of original forest still standing. The growth consists of white, post, red, and chestnut oak, hickory, and heart pine, together with some poplar, dogwood, sourwood, and cedar. Old-field pine is commonly seen on abandoned fields which have reforested naturally.

The Cecil clay loam is particularly adapted to the production of corn, cotton, wheat, oats, clover, and cowpeas, and the more sandy areas of the type to strawberries, potatoes, cabbage, tomatoes, and truck crops, and also small fruit and tree fruit. Cotton yields from one-third to 1 bale per acre; corn from 15 to 35 bushels. As much as 60 or 75 bushels has been secured by deep plowing, good cultivation, the growing of cowpeas, and a liberal application of fertilizer. Wheat yields from 10 to 20 bushels, oats from 20 to 50 bushels, cowpeas from 1 to 2 tons of hay or from 12 to 25 bushels of shelled peas per acre. Irish potatoes, sweet potatoes, cabbage, tomatoes, sweet corn, turnips, beans, strawberries, and garden vegetables are grown successfully both for market and home use. Red clover, crimson clover, vetch, and soy beans are grown to a limited extent. Some sorghum sirup is produced, and also small quantities of apples, peaches, pears, cherries, and figs.

The Cecil clay loam should be plowed a little deeper each year until a depth of 10 or 12 inches is secured. Plowing should preferably be done in the fall and subsoiling occasionally practiced to break up the compact subsoil. The type requires more harrowing than the lighter types to give a fine seed bed, and cultivation must be frequent in order to prevent the formation of a crust and consequent loss of moisture. By following these practices a deeper zone for root development is secured, more plant food made available, and a better supply of moisture maintained during dry seasons. Better internal drainage also will be established which will be an advantage in wet years. Moreover, deeper plowing in the fall and the use of winter cover crops will prevent washing on many of the slopes and largely eliminate the terracing now found necessary.

Cowpea vines, clover, or even the stubble of these crops, or coarse manures, would greatly benefit the soil. The type is susceptible of high and lasting improvement, and by proper management its yields per acre can, in many cases, be doubled or trebled. Rotation is an important factor in such improvement. A practicable succession,

under existing conditions, is corn the first year, sowing cowpeas at last cultivation; then oats or wheat, sowing cowpeas again after harvesting; cotton third year, sowing crimson clover after first picking of cotton.

This soil, as a rule, in order to give maximum yields, needs relatively large applications of acid phosphate, smaller quantities of potash, and considerable nitrogen. The last can be advantageously secured by growing leguminous crops, only the phosphate and potash being purchased. The commercial mixtures used generally have the formulas 8-2-2 or 8-3-3, of which the usual applications for cotton and corn range from 200 to 400 pounds per acre. The home mixture, already mentioned, is also used by some on their soils and nitrate of soda is applied to growing crops.

Land of the Cecil clay loam type varies greatly in price. Location with respect to Charlotte and other markets is the chief factor determining values. Near the towns and along the railroads farms of this type are worth from \$35 to \$75 an acre. In the vicinity of Charlotte prices are higher, ranging from \$75 to \$300 an acre.

The following table gives the average results of mechanical analyses of the soil and subsoil of the Cecil clay loam:

Mechanical analyses of Cecil clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23982, 23984.....	Soil.....	1.6	7.7	11.4	22.6	9.1	27.3	20.4
23983, 23985.....	Subsoil.....	.2	2.4	3.2	8.9	2.8	40.3	41.8

CECIL CLAY.

The Cecil clay, locally known as "heavy red clay land," is composed of a surface soil of reddish-brown to red clay loam or clay, 4 to 6 inches deep, underlain by a stiff, heavy red clay. In many places, especially in the southwestern part of the county, a dark-red heavy clay or clay surface soil is encountered. A similar condition is found in areas bordering the Mecklenburg clay loam. A noticeable content of sand particles is often present in the first inch or two of soil. There are also a few spots of dark reddish brown clay loam called "Sassafras land" or "dead land," the last term referring to the difficulty which is experienced in making it turn or slide off of the plow wing.

The subsoil usually extends to a depth of several feet. It is hard and crumbly when dry and plastic when wet. Occasionally a narrow vein of quartz is seen, and sometimes a few fragments of such rock occur on the surface. Small scales of mica occur in both soil and subsoil in many places.

The Cecil clay occurs indiscriminately throughout the county in large areas, small bodies, and patches. Its greatest development is in Steel Creek and Charlotte Townships, to the east of Croft, just west of Huntersville, along Catawba River in Lemley Township, and in the bend of the river east of Alexander Ferry. Other prominent bodies are situated east of Davidson, near Wilson Grove Church, Arlington, Amity Church, and Downs Church. A large number of spots and patches occur in various parts of the county. Such minor areas are generally associated with the Cecil clay loam.

The surface features of this type vary from level and gently rolling upland areas to hilly and broken areas near the streams. It occupies the knolls, ridges, and steep hillsides in many places, and frequently, near the Catawba River, particularly in the southwest part of the county, erosion has cut deep ravines and gullies. The surface drainage is excellent, but the heavy clay does not allow the free and rapid movement of water downward. This is one reason for the severe erosion on this soil, as much of the rainfall runs off the surface. Shallow plowing has also aided this washing. Breaking the soil deeply is the best means of preventing washing of these clay areas, the deep, loose, open soil taking up the surplus water and holding it back for slow escape underground. The more general growing of grass crops would also greatly aid in holding the soil in its place.

The Cecil clay has been derived from the weathering of hornblende gneiss, schists, diabase, and fine-grained granite. Adjoining the areas of the Mecklenburg clay loam it has been influenced by micaceous diorite. Some few spots in the extreme eastern part of the county have been in part derived from slate, fine fragments of which are seen on the surface. Occasional veins of quartz appear in the subsoil, but in general the rocks underlying this soil have weathered to depths of 15 to 40 feet.

The original forest growth on the Cecil clay was red, white, and post oak and hickory, with a sparse growth of sourwood, dogwood, and poplar and a considerable proportion of heart pine. Much of the hardwood was fine, merchantable timber, and the greater part has been cut. The present second growth is usually old-field pine, cedar pine (*Pinus virginianus*), sassafras bushes, and sweet gum.

The Cecil clay is the best soil in the Piedmont section of North Carolina for wheat, oats, and clover, and also a fine soil for corn and cowpeas and other leguminous crops. Large yields of wheat were secured prior to the war, and even now on this same soil in near-by counties from 20 to 44 bushels per acre are produced. The leading crops at present are corn and cotton. The yields of corn range from 15 to 60 bushels, and of cotton from one-third to 1 bale per acre. Wheat is grown to a very limited extent. It yields from 15 to 30 bushels per acre. From 20 to 60 bushels per acre of oats may be

secured. Cowpeas do well, yielding from 1 ton to 1½ tons of hay per acre. In addition to the general farm crops, cabbage, Irish potatoes, vegetables, sorghum cane, apples, pears, cherries, figs, and peaches are grown. A number of grasses, as orchard, Bermuda, and crab grass, do well.

Cotton is usually fertilized with 200 or 300 pounds of 8-2-2 or 8-3-3 fertilizers, or with a home mixture of acid phosphate, cottonseed meal, and kainit. Some barnyard manure is applied to the crops, particularly in dairy districts.

The producing power of the Cecil clay is practically never realized under existing methods of handling it. Deeper plowing, more thorough preparation of the seed bed, the addition of humus, and fertilization will give marked improvement in productiveness.

Cecil clay land is held at from \$30 to \$200 an acre, the higher price obtaining near the larger towns.

The following table gives the average results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Cecil clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23986, 23988.....	Soil.....	1.2	3.9	4.7	11.3	7.8	20.6	50.3
23987, 23989.....	Subsoil.....	1.6	2.3	2.8	6.3	6.3	20.8	59.9

MECKLENBURG LOAM.

The surface soil of the Mecklenburg loam, to a depth of 6 to 8 inches, is a loam to heavy sandy loam varying in color from dark brown to reddish brown. The more sandy areas are commonly found on the crests of ridges. Small rounded iron concretions are present in the soil in many places. On the east side of McDowell's Creek near its mouth, near Long Creek Church, and between Henderson Ferry and Hopewell Church numbers of rock fragments are scattered on the surface and mixed with the soil. These fragments vary in size from a few inches in diameter to more than a foot or two.

The subsoil is a yellowish-brown or ocher-colored tenacious clay, extending to a depth of 36 inches. Usually at 24 or 30 inches the subsoil becomes more friable, owing to the presence of partially decomposed rock. In some instances the disintegrated rock is encountered within the 3-foot profile. Throughout the southern areas of the type the subsoil contains noticeable quantities of small scales of mica, and these often cause the clay subsoil to possess a greasy feel. Near Hopewell Church and Henderson Ferry a dark-brown sticky clay was found.

The Mecklenburg loam occurs in small bodies in the southwestern part of the county in the vicinity of Center Church and to the east

of Kendrick Crossroads, and also in large bodies west of Hopewell Church, north of Henderson Ferry, and east of Allison's Ferry. One body lies to the east of Huntersville.

This type commonly occupies level, undulating, and gently rolling areas, but in a few instances the surface is rolling. Practically all the areas have good surface drainage, except certain flat areas, in which open ditches are necessary to carry off surplus rain water.

The Mecklenburg loam has been formed by the weathering of the underlying rocks, which are gabbrodiorite or metagabbro and diorite, with abundant mica. These are dark-green rocks with a relatively large content of hornblende, magnetite, some mica, apatite, and feldspar. In their disintegration the feldspar forms clay and the mica is left in the form of small scales. Oxidation of the iron compounds has given a reddish cast to both soil and subsoil. On the more rolling areas and on a few of the ridges the finer materials have been carried away in the drainage water, and a coarser and looser soil is the result.

The original forest growth consisted of white, red, post, and black-jack oak, a considerable quantity of hickory, and a scattering of cedar and pine.

This soil is well suited to corn, cotton, oats, and wheat and admirably adapted for pasture. Japan clover, Johnson grass, and other grasses are indigenous, and where permitted to grow afford fine grazing.

The Mecklenburg loam under favorable conditions and with fertilization produces from one-half to 1 bale of cotton per acre, from 15 to 30 bushels of corn, and from 15 to 40 bushels of oats. Only a few cowpeas and soy beans are grown. Cotton matures a few days earlier on this soil than it does on the heavier soils. Much of the eroded areas should be used for sheep pasture.

Practically all crops are fertilized to a greater or less extent. About the same treatment can be applied to this soil as recommended for its associated type, the Mecklenburg clay loam.

This land sells for about the same price as the clay loam, excepting areas in remote sections and those carrying much stone.

The following table gives the results of mechanical analyses of the soil and subsoil of the Mecklenburg loam:

Mechanical analyses of Mecklenburg loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
24002.....	Soil.....	2.3	6.9	7.5	25.2	21.7	19.0	17.3
24003.....	Subsoil.....	.2	1.8	3.9	13.3	9.5	20.3	51.1

MECKLENBURG CLAY LOAM.

The surface soil of the Mecklenburg clay loam, locally known as "red black-jack land," consists of 4 to 8 inches of brown to reddish-brown or red heavy loam or clay loam. A few small iron concretions are found in the soil in local areas. On the eroded slopes or near the surface in many places a heavy clay loam or clay is encountered, and this is usually red or reddish in color. Again there are small areas or spots where a veneer of very fine sandy loam an inch or two thick occurs. Occasionally a few quartz fragments are seen on the surface.

The subsoil of this type consists of a yellowish-brown or ochre to red-colored clay, extending to a depth of 24 to 30 inches. This material is sticky when wet, cracks when dry, is slightly tenacious, and possesses a greasy, soft feel, the result of small scales of mica. The subsoil is usually somewhat heavier and of a more pronounced red color near the contact with the surface soil. As the depth increases it becomes yellower and also more friable to 30 inches, where it passes into the rotten diorite or gabbro rock. The subsoil sometimes extends to a depth of 4 feet.

The Mecklenburg clay loam is typically developed in uniform bodies in the southern and southwestern parts of the county. The largest areas, however, are situated near the headwaters of Neal and Stowe Branches, around Potts Store, Pineville, and the lower course of McAlpine Creek. Many narrow strips are found. A few bodies also occur around Hopewell Church and in other parts of the county.

This type of soil possesses a level or undulating to gently rolling surface in the interstream areas, and rolling to slightly broken areas along the streams and on the slopes. The surface drainage is usually good in all except the flattest areas, and these can be drained easily by open ditches. On account of the close character of the subsoil, percolation of the rainfall takes place slowly and the run-off is excessive, causing some damage from erosion on the steeper slopes.

The Mecklenburg clay loam is a residual soil, i. e., one formed through weathering from underlying rocks. These rocks are principally mica-diorite and gabbro-diorite or metagabbro, and contain large amounts of magnetite (about 13 per cent), apatite, and feldspar, hornblende, and mica. The feldspar and apatite in weathering form clay, while the mica is left as small scales. The red color of the subsoil is due to oxidation of the iron compounds. The minute dark-colored particles seen in ditches and gullies are composed of iron. The weathering in this soil, as in the Iredell soils, has not proceeded to any great depth, owing to the tenacious and sticky subsoil which retards the free passage of air and water. A stratum of greenish-gray, soft, rotten rock lies between the true subsoil and the unweathered bedrock.

On the forested areas white, post, red, and black-jack oak, together with considerable hickory and a few pines and cedars, constitute the growth. The second growth is usually old-field pine and cedar, the latter being most plentiful on the eroded knolls. Johnson grass is a characteristic growth of the soil.

This soil is especially adapted to clovers, vetches, and soy beans. It is also a good soil for cotton, wheat, corn, and oats. Cotton yields from one-half to 1 bale, corn from 20 to 40 bushels, oats from 20 to 40 bushels, and wheat from 12 to 20 bushels per acre. Larger yields of all crops can be easily secured, and in some instances as much as 60 bushels of corn and 1½ bales of cotton have been produced. Johnson grass and Japan clover furnish excellent pasturage, though it is said that continual pasturing of the former will kill it in two or three years. It makes its best development in the cultivated fields. Of the fertilizer salts, kainit gives better results than any other. It prevents in a large measure the "frenching" of corn and the "rusting" of cotton. Little or no rust occurs over large areas where the subsoil extends to depths of 3 to 4 feet or more. Some complaint is heard that cotton rusts when planted after cowpeas, but those who use kainit liberally have no trouble from this disease.

The Mecklenburg clay loam is naturally a very strong and productive soil and one which can be built up to a high state of productivity by proper farm management. Deep fall plowing, so as to allow the clay to freeze and thaw during the winter, will greatly improve the physical condition of the soils, and the growing of legumes and the use of phosphatic fertilizers and lime will be found profitable.

Land of this type of soil where well-improved sells for \$35 to \$75 an acre. Where the improvements are nominal farms may be had for \$25 to \$40 an acre.

The following table gives the average results of mechanical analyses of the soil and subsoil, and a single analysis of the lower subsoil of the Mecklenburg clay loam:

Mechanical analyses of Mecklenburg clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
24004, 24007.....	Soil.....	1.5	3.4	5.9	23.9	18.5	16.8	30.4
24005, 24008.....	Subsoil.....	.6	2.4	3.6	12.2	10.3	25.3	45.7
24006.....	Lower subsoil.	.0	1.2	4.1	20.8	19.9	28.4	25.6

IREDELL FINE SANDY LOAM.

The surface soil of the Iredell fine sandy loam, or "black-jack land," consists of 5 to 10 inches of gray to dark-colored medium to fine sandy loam. The typical areas and also the darker bodies con-

tain a small percentage of small, rounded iron concretions. There occur a few bodies of light-gray fine sandy loam, varying in depth from 8 to 15 inches, and resembling Durham sandy loam in surface appearance. To the southeast of Coopers Store the soil has a greenish to brown cast. Near Neals Store and along the Cabarrus line areas of this soil are mingled with areas of the Cecil fine sandy loam and in some places a yellowish sandy clay is encountered. A few quartz gravel are found on the surface in some places, and stones and boulders occur in some small patches.

The subsoil is a yellowish to brown impervious sticky clay commonly called "pipe clay" or "beeswax land." The clay is very coherent and sticky when wet and cracks when dry. On exposure to air and water it turns a dull-brown color. The subsoil seldom extends below 24 or 30 inches, grading at these depths into the rotten rock. In certain places where granitic rock is found the subsoil is a yellowish sticky sandy clay. Occasionally a reddish-brown clay is encountered.

The main occurrence of this type is in the northeastern and western parts, although small bodies are scattered throughout the county. The largest areas are situated along Mallard Creek and south of Long Creek Church. A body also lies north and east of Sharon Church.

The surface features of the Iredell fine sandy loam vary from level to rolling, most of the type being rolling and composed of ridges, knolls, and slopes. In some sections the topography is rough and broken, especially in places along the Cabarrus line. The natural surface drainage is, in general, good, only the level areas being in need of ditching. The open texture of the soil, together with its rolling surface, causes it to drain quickly, and the soil is warmer than the Iredell loam.

The Iredell fine sandy loam is a residual soil derived from diorite together with some granite. The depth to which these rocks have decomposed is about the same as in the case of the Iredell loam. There are considerable areas derived from granitic rock and also from a coarse diorite, and this accounts for the high percentage of sand in the surface soil and the more friable subsoil found in many places.

The forest growth is largely black-jack oak. In places there is some post and willow oak and considerable cedar. In abandoned areas old-field pine has taken possession of the land.

The Iredell fine sandy loam is best adapted to small grains and grasses, and should be used for pasture. The more rolling and broken bodies would make excellent sheep pastures. Some areas of it are fairly well suited for the production of corn and cotton. Cotton

yields from one-third to 1 bale, corn from 12 to 30 bushels, oats from 20 to 50 bushels, and wheat from 10 to 15 bushels per acre. Cowpeas do well. Potatoes, cabbage, and other vegetables, and some fruits, do fairly well. Sorghum also gives fair yields. The cotton, corn, and small grain are all fertilized, and the larger yields have been secured when liberal applications were given. Kainit is beneficial and is being used more generally. The soil needs more humus and lime. Stable manure should be applied wherever available.

Some rust of cotton is reported, but it is not nearly as prevalent as on the Iredell loam. Omitting deeper plowing on the deeper and more sandy areas, this soil requires practically the same treatment and fertilization as the Iredell loam.

Land composed of Iredell fine sandy loam is held at \$20 to \$40 an acre.

The following table gives the average results of mechanical analyses of the soil and subsoil of the Iredell fine sandy loam:

Mechanical analyses of Iredell fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23998, 24000.....	Soil.....	5.1	8.8	8.7	23.7	21.0	20.0	12.6
23999, 24001.....	Subsoil.....	.6	1.7	1.7	6.1	14.3	32.2	43.6

IREDELL LOAM.

The surface soil of the Iredell loam consists of a dark-gray, drab, or dull-brown loam to heavy fine sandy loam, with a depth of 4 to 8 inches. The subsoil is a yellowish to brown, generally yellowish-brown, impervious, waxy, sticky clay, extending to a depth of 20 to 36 inches. Occasionally at 20 inches, and frequently at 24 or 30 inches, this clay passes into soft, disintegrated dark-green rock. On a few knolls where erosion has been active this rock comes within a few inches of the surface soil. The subsoil on exposure to weathering turns a yellowish-brown or dull rusty color. The clay cracks upon drying. When wet it has the consistency of putty or dough.

The soil contains from 5 to 25 per cent of small, rounded iron concretions, but these do not interfere with cultivation. Throughout a large part of the type the interstitial material is a very fine sand mixed with considerable silt. On a few of the ridges, where the soil is light gray in color, the proportion of fine sand is greatly increased, and the soil approaches the fine sandy loam in texture. Such areas are generally practically free from concretions. In low places, particularly in wooded areas, the surface soil is almost black in color, owing to the presence of large quantities of organic matter. Another

variation consists of spots on the slopes where the surface soil is a very fine sandy loam 2 to 4 inches deep, underlain immediately by sticky clay. In other local spots there are found a few dark-colored stones, locally called "niggerheads," on the surface.

The Iredell loam for the most part is situated in the southern part of the county. Its greatest development occurs east of Pineville, north of Downs Church, around and to the north of Kendrick Crossroads, and south of Shopton. Large bodies also occur west of Hopewell Church, east of Long Creek Church, and east of Jonas Church. Smaller spots are distributed throughout all sections of the Black-jack district.

This soil type is generally characterized by its flat, undulating, and gently rolling surface features, though some areas occupying the knolls and ridges are more uneven. In the more eastern areas also a part of the surface is rolling and broken near the streams. The more rolling areas possess good surface drainage, but the drainage of the flatter areas is poor, and open ditches are essential in preparing the land for cropping. Some little trouble is experienced in the spring and during heavy rains in summer in getting these areas dry. The impervious clay subsoil which prevents drainage also increases the effects of drought. The lower lying areas are naturally rather cold and do not warm up quickly in the spring.

The Iredell loam has been formed through weathering from igneous and highly metamorphosed rocks. Of these, the diorite, which is a dark-green to almost black rock, and composed mainly of plagioclase or sodalime feldspar and hornblende, is the most common. Some areas of acid granite occur, and where these are found the soil is more sandy. In no instance has the weathering of these rocks extended to any great depth and the solid bedrock is reached within a foot or so below the subsoil.

Black-jack oak is the predominating forest growth, although some post oak and willow oak is found. On ridges and slopes cedar and old-field pine are characteristic trees.

Until recently the Iredell loam has been looked upon as a poor soil for general farming, but now it is highly prized. In Mecklenburg County it is well adapted to cotton, corn, oats, wheat, and the grasses. Of these, oats do better than any other crop. Cotton yields from one-third to 1 bale, corn from 20 to 40 bushels, oats from 30 to 60 bushels, and wheat from 10 to 30 bushels per acre. Cowpeas, vetch, Johnson grass, and lespedeza do well. The grasses make an excellent growth and afford good pasturage for cattle or sheep, and stock raising could be profitably extended. Fruits do not produce as well on this soil as on the Cecil types, but even here some good peaches are grown. Cabbage, sorghum, potatoes, and garden vegetables are grown for home use.

One of the best and most economical ways to improve the Iredell loam is to plow deeper, turning the soil in the fall, and occasionally subsoiling, leaving the land rough and exposing a thin layer of the sticky clay subsoil to the weather. Alternate freezing and thawing during the winter will cause the materials to crumble, and by spring a much better physical condition will have been produced. This method promotes better drainage and besides affords a deeper seed bed for the plants, and will tend to prevent the rusting and frenching of the crops. At present these diseases affect the crops on practically all areas of the type. The rust of cotton usually shows from the first to the middle of July, and the diseased plants never fully open their bolls, making picking difficult.

A good rotation for the Iredell loam would be corn, sowing cowpeas at last plowing, followed by winter oats and then by cotton. It is said that cotton is especially subject to "rust" when grown immediately after cowpeas have occupied the land. The same brands and mixtures of fertilizers are used on this soil as on the other soils of the county. It is likely that home mixing of ingredients, giving 10 per cent phosphate, 9 per cent potash, and 2 per cent nitrogen would give better results with cotton than the low-grade fertilizers now used. Corn needs a somewhat larger amount of nitrogen. Cotton requires a relatively heavy application of kainit to correct the rust. A top dressing with nitrate of soda applied to corn in the middle of July will give increased yields. The Iredell loam needs manure, and lime. Of the former the supply is wholly inadequate, but the latter can be purchased cheaply, and if used alone or in combination with fertilizers will be found profitable.

Areas of this soil south of Shopton and around Potts Store sell at \$30 to \$50 an acre, while some in other sections can be bought for \$25 an acre.

DURHAM SANDY LOAM.

The surface soil of the Durham sandy loam consists of 8 to 20 inches of yellowish-gray to gray medium sandy loam, changing to yellowish sandy loam below the surface. The subsoil is for the most part a yellow friable clay or sandy clay, containing sharp sand particles, though in places it has a reddish-yellow mottled or brown color. The brown clay is usually tough and tenacious and is found where the material has been derived from dikes of diorite. The subsoil occasionally grades into rotten granite at 36 inches. A little mica is found in both soil and subsoil.

In a few places the surface of this soil has a whitish appearance and such spots are practically free from organic matter. In other places considerable coarse sand or fine gravel is present in the soil, the quantity being sufficient to affect the texture. Such bodies occur near Spurrier and to the east of Long Creek.

This type occurs in an almost unbroken, though irregular belt, extending across the northern-central part of the county. It begins near the Catawba River, west of Spurrier, and swings northeastward across the county along Long Creek, passing just south of Huntersville and following the South Prong of Clarks Creek to near the Cabarrus line. Two other bodies, one lying southeast of Matthews and another south of Newell, are of importance.

The surface of this soil is gently rolling on the crest of the ridges and also over a part of the areas south of the South Prong of Clarks Creek. Along the river and near Spurrier the surface is rolling to hilly and broken with many ravines and gullies. The open texture of the soil and its topographic position give excellent surface drainage. On some of the steeper slopes erosion is pronounced. Especially is this true in the region south of the South Prong of Clarks Creek.

The Durham sandy loam is a residual soil derived mainly from coarse-grained granites and to a less extent from gneiss. Most of the granite is a biotite variety composed mainly of feldspar and quartz with a small proportion of mica. Throughout these formations there occur narrow dikes of diorite and the weathering of this rock has influenced the character of the subsoil in some places.

The original forest growth consisted of white, post, and red oak, with some hickory, heart pine, and occasional trees of sourwood and dogwood. Only patches of merchantable timber remain. The second growth is old-field pine, scrub oak, and sweet gum.

The Durham sandy loam is well adapted to the production of bright tobacco, although none is grown on a commercial scale in Mecklenburg County. It is also particularly suited to sweet potatoes, berries, watermelons, cantaloupes, and truck crops. By proper rotation and fertilization corn, cotton, and rye can be profitably produced. Cotton yields from one-fourth to one-half bale, corn 10 to 20 bushels, and sweet potatoes 100 to 300 bushels per acre. Rye does fairly well. Watermelons and cantaloupes give large yields of fine quality. Cowpeas and sorghum give fair returns while the yields of the small grains are low. Fruits, especially peaches, find the soil congenial:

There is practically no difference in the fertilizer practice on this type and on the Cecil sandy loam. The type is deficient in humus, as one would naturally conclude from the whitish color of the surface soil, and green manuring crops and stable manure should be used liberally. Cowpeas have proved a valuable crop in improving this soil. Well filled with humus, the type will hold more moisture and be more loamy—improvements in physical condition that will be reflected in larger yields. Land of this type sells at \$20 to \$40 an acre.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Durham sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23991.....	Soil.....	4.4	29.2	20.3	18.6	8.1	12.8	6.4
23992.....	Subsoil.....	1.5	17.9	13.9	12.7	5.6	15.5	32.7

ALAMANCE SILT LOAM.

The soil of the Alamance silt loam is a yellowish-gray to whitish floury silt loam, from 4 to 6 inches deep, the material containing a few fine fragments of slate. The subsoil is a yellow silty loam grading into a yellow silty clay and extending in typical areas to a depth of 36 inches or more. In places a diorite rock is found, and here the subsoil is a mottled sticky clay. There are also local spots with a red silty clay subsoil.

Throughout the type are encountered spots of slate loam, in which the yellowish-gray soil carries from 20 to 50 per cent of broken and angular fragments of slate. The subsoil of these areas consists of a yellowish silty loam resting on the partially decomposed slate at shallow depths, seldom over 12 inches. In places the rock outcrops.

The Alamance silt loam in Mecklenburg County is but the beginning of an extensive belt of soil which extends across Cabarrus, Union, Stanley, and other counties. Only about 2 square miles of the type occurs in the county and this is confined to practically one body in the extreme eastern part, along the Union County line, just south and east of Clear Creek Church. The surface features vary from level or gently rolling to rolling and sloping. The drainage is good, except in the flatter spots, and here open ditches serve every purpose.

The Alamance silt loam is a residual soil derived from "Carolina slates."¹ In some places these rocks have weathered to depths ranging from 3 to 20 feet; in others the bedrock comes to within a few inches of the surface.

The larger proportion of this type is forested to white oak, with some post oak, black-jack oak, and pine. The soil is suitable for pasturage. Apples will do well on areas with the bedrock below 4 feet. The uniform areas with deep subsoil are adapted to corn, oats, wheat, and cotton. The soil is deficient in humus, but where this is supplied and lime and phosphatic fertilizers used, fair to good yields are secured. The type can readily be brought to a higher state of productiveness.

¹ Bulletin No. 21, North Carolina Geological Survey.

At present only low yields of corn, cotton, and oats are obtained, the yield depending upon the amount of fertilizer or manure applied. Where the bedrock is near the surface, the soil is droughty and it is not especially desirable for general farming purposes. Some merchantable timber is still found on the areas of this soil.

Owing to location remote from Charlotte and other markets, the value of the Alamance silt loam is comparatively low.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

Mechanical analyses of Alamance silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
23972.....	Soil.....	2.9	5.3	3.8	9.1	4.4	60.8	13.7
23973.....	Subsoil.....	1.9	2.4	1.5	4.1	4.1	58.4	27.6

CONGAREE FINE SANDY LOAM.

The Congaree fine sandy loam is a fine mellow sandy loam, varying in color from light brown to reddish brown, and usually extending to a depth of 36 inches or more. Occasionally at 15 or 20 inches the subsoil becomes more silty and is slightly heavier in texture and more compact. Small scales of mica are present in this soil in considerable quantities. Several variations occur which are of some importance agriculturally, but which are too small or too complicated in development to be shown on a map of the scale used in this survey. In the depressions a brown loam, silt loam, or reddish clay loam occurs. Sometimes gray or whitish fine sand is found as ridges or very narrow belts near the river. This sand is commonly from 3 to 10 feet deep and is loose and incoherent and in places dunelike.

The Congaree fine sandy loam is confined to the bottoms along the Catawba River, where it occurs as narrow strips extending practically along the entire course of the river through the county and varying in width from a few rods to about one-third of a mile.

The areas of Congaree fine sandy loam lie from 8 to 15 feet above normal water level of the stream. They have for the most part a level to undulating surface. The sand ridges are gently rolling and are a little higher than the surrounding soil. The loamy areas in the depressions are usually found along the margin next to the upland or through the interior of the areas.

The sand areas are droughty as the rainfall passes rapidly downward. The fine sandy loam areas are also sufficiently porous to allow of the easy passage of water, but the texture is such that excellent capillary action is established and the supply of moisture

is adequate for crops. The depressions are naturally poorly drained but are usually ditched and are then suitable for farming. At times of high water parts of the bottom lands are overflowed, but good crops are commonly secured.

This soil is of alluvial origin and composed of materials which have been washed from the surrounding uplands mingled with others brought from a distance by the Catawba River. The sand ridges have been formed at times of extreme high water over areas covered by swift currents. Some of the good bottom land has been covered by sand in this way during recent years and rendered unproductive. The soil is mellow, smooth, and very easily tilled, and most of it is under cultivation. Machinery can be used on all areas of it. The typical fine sandy loam areas are suited to corn, watermelons, rye, and oats. From 20 to 40 bushels of corn per acre is a fair yield. Some very fine melons are produced. A few fields of oats were seen and appeared to be in satisfactory condition. The more loamy areas are suited to corn and pumpkins, but the sand ridges are practically worthless, except for rye, watermelons, and peanuts. The best drained areas of fine sandy loam grow good crimson clover. A small quantity of grass is grown on the lower lying spots for hay. The soil is not usually enriched for corn, but watermelons are usually manured and fertilized.

This bottom land has always been highly prized for the production of corn. It is difficult to state its value, as it is sold with adjoining upland areas.

The following table gives the results of a mechanical analysis of the soil of this type:

Mechanical analysis of Congaree fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
23990.....	Soil.....	<i>Per cent.</i> 1.4	<i>Per cent.</i> 8.1	<i>Per cent.</i> 8.9	<i>Per cent.</i> 32.8	<i>Per cent.</i> 19.5	<i>Per cent.</i> 17.5	<i>Per cent.</i> 11.4

MEADOW.

The land mapped as Meadow consists of soils having a varied texture. The areas of different textures are small, and not only would separation be difficult in most cases, but they could be shown on the map only if greatly exaggerated. If separated the materials would be classed with the Congaree series of soils.

Throughout the clay and clay loam areas and situated in the wider bottoms the soil is a brown loam or silty loam for a depth of 3 or 4 feet. There is not much difference between the surface soil and the subsoil, except that the latter is sometimes a little lighter in color and more compact or more sandy. The bottoms in the

Mecklenburg and Iredell soils have a dark-colored loam soil containing much hornblende. On the sandy loam areas the soil varies from sand to sandy loam, usually gray to brown in color. Mica scales are present in all areas of Meadow. In taking borings it was common to find several different strata of material within 3 feet.

Meadow is well distributed throughout the county and lies as narrow strips along most of the creeks and branches. The widest and longest areas are found along the West Branch and South Prong of West Branch of Rocky River, and McDowell's, Long, Mallard, Reedy, Little Sugar, Sugar, Brier, McMullen, McAlpine, and Clear Creeks.

The surface is flat and level and lies only a few feet above normal water level of the streams. Most of it is subject to overflow at times of very heavy rainfall, and open ditches are necessary to drain the broader areas. Practically all areas could be drained, reclaimed, and made productive by straightening and in some places deepening the natural drainage ways.

Meadow has been formed by the wash of materials from the surrounding soil formations carried into the streams at times of high water and deposited. Some of the material has simply been washed down from the adjoining hillsides. The soil is thus in the main alluvial, though modified to some extent by colluvial materials.

Owing to low-lying position and consequent moist condition, vegetation has flourished upon the Meadow areas and considerable organic matter has accumulated in the soil. This accounts in a large measure for the high productiveness of the better areas. Some of the floods in recent years have deposited sand over certain areas and rendered it only fit for grazing purposes.

Parts of the Meadow are cultivated. Large yields of corn and sorghum are secured. From 30 to 60 bushels of corn per acre without any fertilizer is not an uncommon yield. From other areas considerable wild hay is secured. There are large areas used as summer pastures and these afford excellent grazing, especially valuable during periods when the upland pastures are dry.

SUMMARY.

Mecklenburg County lies on the southern boundary in the western part of the State. It contains 543 square miles, or 347,520 acres. It is the foremost county in the State and has a population of 67,000.

The surface is level, gently rolling to rolling, and broken. Many broad, level to gently rolling interstream areas occur. The hilly and unbroken areas occur along the large streams. The elevation of the county varies from 520 feet on the southern border to 850 at its northern end. The surface slopes to the south and southwest, except in the northeastern part where the inclination is toward the eastward.

The Catawba River and Rocky River, with their numerous tributaries, form an excellent drainage system. Much water power has been developed on the streams.

Transportation facilities are good. The main line of the Southern Railway, with two branches, and the Seaboard Air Line Railway cross the county. About 225 miles of graded and macadamized roads have been built. Good schoolhouses, churches, and farmhouses are seen in many parts of the county. Rural delivery of mail is fully developed.

Electricity generated in South Carolina is transmitted to all parts of the county. Charlotte, with a population of 34,014, is the largest city in the State. This city and other towns offer markets for all the products of the county.

There is a growing local demand for truck and other special crops as well as for the staple products.

The climate is mild and healthful and favorable for agriculture, with ample rainfall well distributed.

The soils of Mecklenburg County are typical Piedmont soils. They have been formed through processes of weathering from the underlying rocks, principally granites, gneisses, schists, gabbros, and various diorites.

There are three main soil series. The Cecil series is most important, covering the greater part of the county. Two main groups of soil predominate in this series, viz, the gray sandy loams, which vary in texture from fine to coarse, and the heavier red clay loam and clay.

The Iredell series is represented by two types, the Iredell loam and Iredell fine sandy loam.

In the Mecklenburg series are found the Mecklenburg loam and Mecklenburg clay loam.

In addition to these three main series there occur bodies of Durham sandy loam, and in the extreme southeast corner spots of Alamance silt loam. Small bodies of alluvial soil complete the list.

The gray sandy loams are best suited to the production of truck crops, sweet potatoes, peanuts, berries, and watermelons, but all crops common to the county can be profitably grown. The red lands, the Mecklenburg soils, and parts of the Iredell soils are admirably adapted to the production of wheat, corn, oats, grasses, and clovers.

Mecklenburg with its large industrial enterprises is an excellent agricultural county. Land values range in price from \$20, for the rougher and more remote areas, to \$100 per acre for good farming lands near towns.

The county offers many opportunities for those who would engage in farming, trucking, dairying, and poultry raising.

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